



# Shanghai Expert Consensus of hemoperfusion therapy application in maintenance hemodialysis patients

Gengru Jiang<sup>1</sup>

<sup>1</sup>Xinhua Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai Medical Association Society of Nephrology, China

Email: jianggengru@xinhumed.com.cn

**Background:** The accumulation of protein-bound uremic toxins and middle-large molecule toxins in maintenance hemodialysis can cause hemodialysis-related complications such as pruritus, sleep disorders, peripheral neuropathy, dialysis-related amyloidosis, and refractory hypertension in MHD patients. We would like to evaluate hemoperfusion therapy in MHD patients including appropriate patients, treatment frequency, treatment mode, adverse effects.

**Methods:** According to the collection and analysis of Chinese and International published literature, robust evidence on hemoadsorption therapy, mainly studies with HA130 hemoperfusion in MHD patients, showed HP could remove these uremic toxins and reduce the incidence of hemodialysis-related complications, to improve MHD patient's quality of life and survival rate. Shanghai Expert Consensus of HP application in MHD patients was generated based on these potent evidences to provide guidance for the reasonable and standardized treatment of HP in MHD patients.

**Consensus:** When MHD patients show the following clinical manifestations, it is recommended to start HP treatment, and individual HP treatment frequency depends on the patient's complications and their severity:

1. Severe uremic pruritus: MHD patients Modified Duo's Pruritus Score > 12 or VAS score > 8;
2. Severe uremia-related sleep disorders: Pittsburgh Sleep Quality Index (PSQI) ≥ 10;
3. Protein-energy Wasting (PEW): Modified Quantitative Subjective Overall Assessment (MQSGA) score > 20 or Malnutrition Inflammation Score (MIS) > 18;
4. Microinflammatory status: with persistent existence of hs-CRP > 3 mg/L, CRP > 8 mg/L, IL-6 ≥ 16.2 pg/ml, TNF-α ≥ 41.22 pg/ml, excluding the conditions in infection, malignant tumor history, activity period of rheumatic immune disease, etc.;
5. Severe secondary hyperparathyroidism: cannot be controlled by drug treatment and persistent existence of iPTH > 600 pg/ml;
6. Severe hyper β<sub>2</sub>-MG: persistent existence of serum β<sub>2</sub>-MG > 30 mg/L, or combined with carpal tunnel syndrome;
7. Refractory hypertension: MHD patients with dry weight standards, using three or more different types of antihypertensive drugs, and when each drug reaches maximum dose or maximum tolerance, still with SBP > 160 mmHg before dialysis starts;
8. Restless legs syndrome (RLS): RLS Severity scale score ≥ 11;
9. Uremic peripheral neuropathy: limb numbness, sensory abnormalities or retardation, muscle tension or tendon reflex weakened or disappeared, peripheral neurophysiological examination showed that involving ≥ 2 neurological abnormalities.

Complication	Recommended frequency of HP treatment
Severe uremic pruritis	1 or 2 times every 2 weeks
Severe uremia-related sleep disorders	PSQI ≥ 10 points: once a week; 5 points < PSQI < 10 points: once or twice every two weeks
Protein-energy Wasting (PEW)	Once a week
Microinflammatory condition	1 or 2 times every 2 weeks
Severe secondary hyperparathyroidism	Once a week
Severe hyper β <sub>2</sub> -MG	1~3 times a week
Refractory hypertension	1 or 2 times every 2 weeks
Restless Leg Syndrome (RLS)	Once a week
Uremic peripheral neuropathy	Once a week

**Conclusions:** Hemoperfusion therapy has been proved effective for MHD patients. Combining HD/HDF and HA130 hemoperfusion therapy can prevent maintenance dialysis-related complications and improve patient's quality of life and prognosis. However, for the timing and frequency of HP, more high-quality evidence-based studies are still needed to be performed and clarified, to provide a basis for the application of HP in MHD patients.

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